

CLAIMS

1. A channelizing receiver, said channelizing receiver including a plurality of channel receivers, each said channel receiver comprising:

a plurality of filters, each of said filters receiving an input signal representing electromagnetic signals falling within a frequency range being monitored by said channel receiver and transmitting an output signal representing electromagnetic signals falling within a segment of said frequency range;

a plurality of threshold detectors, each of said threshold detectors receiving one of said output signals and producing a detection signal if said one output signal exceeds a predetermined threshold;

a signal amplitude calculation unit for receiving said output signals and said detection signals, starting an initial timing period in response to the receipt of one of said detection signals indicating detection of an electromagnetic signal and producing a magnitude signal providing the magnitude during said initial timing period of the output signal to which said one detection signal corresponds; and

a channel to channel arbitration unit for receiving said magnitude signal and a first other magnitude signal from a first other channel receiver of said channelizing receiver produced in response to said first other channel receiver's detection of said electromagnetic signal during said initial timing period within a first other frequency range being monitored by said first other channel receiver, comparing said magnitude signal and said first other magnitude signal, and if said first other magnitude signal is greater than said magnitude signal, inhibiting the transmission from said channel receiver of data responsive to said one detection signal.

2. A channelizing receiver as in claim 1, wherein said magnitude signal provides the peak amplitude reached during said initial timing period by said output signal.

3. A channelizing receiver as in claim 1, wherein said plurality of filters comprises a plurality of low pass filters having different cut off frequencies.

4. A channelizing receiver as in claim 3, wherein said signal amplitude calculation unit is adapted for initiating an additional timing period in response to said one detection signal, identifying a group of said threshold detectors producing detection signals during said additional timing period and producing a peak amplitude signal providing the peak amplitude reached during said additional timing period by the output signal corresponding to the detection signal produced by the threshold detector of said group associated with the low pass filter having the lowest cut off frequency.

5. A channelizing receiver as in claim 1, wherein said channel to channel arbitration unit is adapted for permitting the transmission from said channel receiver of said data if said first other magnitude signal is less than said magnitude signal.

6. A channelizing receiver as in claim 5, wherein said data provides the beginning of a pulse of said electromagnetic signal, the end of said pulse and an estimate of the frequency and bandwidth of said pulse.

7. A channelizing receiver as in claim 1, wherein said channel to channel arbitration unit is adapted for receiving a second other magnitude signal from a second other channel receiver of said channelizing receiver produced in response to said second other channel receiver's detection of said electromagnetic signal during said initial timing period within a second other frequency range being monitored by said second other channel receiver, comparing said magnitude signal

with said second other magnitude signal, and if one or both of said first other magnitude signal and said second other magnitude signal is greater than said magnitude signal, inhibiting the transmission from said channel receiver of said data.

8. A channelizing receiver as in claim 7, wherein said first other frequency range is immediately below said frequency range and said second other frequency range is immediately above said frequency range.

9. A channelizing receiver as in claim 7, wherein said channel to channel arbitration unit is adapted for permitting the transmission from said channel receiver of said data if both said first other magnitude signal and said second other magnitude signal are less than said magnitude signal.

10. A channelizing receiver as in claim 9, wherein said data provide the beginning of a pulse of said electromagnetic signal, the end of said pulse and an estimate of the frequency and bandwidth of said pulse.

11. A channelizing receiver as in claim 4, wherein each said channel receiver further comprises a bandwidth and frequency estimation unit for receiving said peak amplitude signal and a first other peak amplitude signal from said first other channel receiver produced in response to said first other channel receiver's detection of said electromagnetic signal during said additional timing period, and producing an estimation signal providing an estimate of the frequency and bandwidth of said electromagnetic signal based upon said peak amplitude signal and said first other peak amplitude signal.

12. A channelizing receiver as in claim 11, wherein said bandwidth and frequency estimation unit is adapted for receiving a second other peak amplitude signal from a second other channel receiver of said channelizing receiver produced in response to said second other channel receiver's detection of said electromagnetic signal during said additional timing

period within a second other frequency range being monitored by said second other channel receiver, and producing said estimation signal based upon said peak amplitude signal, said first other peak amplitude signal and said second other peak amplitude signal.

13. A channelizing receiver as in claim 12, wherein said first other frequency range is immediately below said frequency range and said second other frequency range is immediately above said frequency range.

14. A channelizing receiver as in claim 2, wherein said signal amplitude calculation unit is adapted for identifying said peak amplitude by identifying a predetermined number of consecutive samples of said one output signal having values less than said peak amplitude.

15. A channelizing receiver as in claim 1, wherein each said channel receiver further comprises a multiplexer for receiving said output signals and selecting particular ones of said output signals for transmission to said threshold detectors.

16. A channelizing receiver as in claim 1, wherein said filters are finite impulse response filters.

17. A channelizing receiver as in claim 1, wherein each said channel receiver further comprises a bandpass filter for receiving from an antenna electromagnetic signals being monitored by said channelizing receiver and transmitting to said channel receiver said electromagnetic signals falling within said frequency range being monitored by said channel receiver.

18. A channelizing receiver as in claim 17, wherein each said channel receiver further comprises a log detector for receiving from said bandpass filter said electromagnetic signals being monitored by said channel receiver and providing an output signal proportional to the power of said

electromagnetic signals being monitored by said channel receiver.

19. A channelizing receiver as in claim 18, wherein each said channel receiver further comprises an analog to digital converter for receiving said output signal from said log detector and providing a digital representation of said output signal for transmission to said plurality of filters.

20. A channelizing receiver as in claim 17, wherein said antenna is an orthogonally polarizing antenna for orthogonally polarizing said electromagnetic signals being monitored by said channelizing receiver.

21. A channelizing receiver as in claim 1, wherein said electromagnetic signals are radio frequency signals.

22. A channelizing receiver, said channelizing receiver including a plurality of channel receivers, each said channel receiver comprising:

a threshold detector for receiving an input signal representative of an electromagnetic signal detected by said channel receiver and producing a detection signal if said input signal exceeds a predetermined threshold;

an output interface for transmitting data responsive to said detection signal from said channel receiver;

a signal amplitude calculation unit for producing a magnitude signal providing the magnitude of said input signal; and

a channel to channel arbitration unit for comparing said magnitude signal to a first other magnitude signal from a first other channel receiver of said channelizing receiver produced in response to said first other channel receiver's detection of said electromagnetic signal, and if said magnitude signal is less than said first other magnitude signal, inhibiting said output interface from transmitting said data.

23. A channelizing receiver as in claim 22, wherein said channel to the channel arbitration unit is adapted for comparing said magnitude signal to a second other magnitude signal from a second other channel receiver of said channelizing receiver produced in response to said second other channel receiver's detection of said electromagnetic signal, and inhibiting said output interface from transmitting said data if said magnitude signal is less than one or both of said first other magnitude signal and said second other magnitude signal.

24. A channelizing receiver as in claim 23, wherein each said channel receiver further comprises a bandwidth and frequency estimation unit and wherein said data comprises an estimate of the bandwidth and frequency of said electromagnetic signal calculated by said bandwidth and frequency estimation unit on the basis of an additional magnitude signal produced by said signal amplitude calculation unit in response to said detection signal, a first other additional magnitude signal from said first other channel receiver produced in response to said first other channel receiver's detection of said electromagnetic signal and a second other additional magnitude signal from said second other channel receiver produced in response to said second other channel receiver's detection of said electromagnetic signal.

25. A channelizing receiver as in claim 22, wherein said channel to channel arbitration unit is adapted for permitting the transmission from said output interface of said data if said magnitude signal is greater than said first other magnitude signal.

26. A channelizing receiver as in claim 23, wherein said channel to channel arbitration unit is adapted for permitting the transmission from said output interface of said

data if said magnitude signal is greater than both said first other magnitude signal and said second other magnitude signal.

27. A channelizing receiver as in claim 24, wherein said data provides the beginning of a pulse of said electromagnetic signal, the end of said pulse and an estimate of the frequency and bandwidth of said pulse calculated by said bandwidth and frequency estimation unit.

28. A channelizing receiver as in claim 23, wherein said channel receiver is adapted for monitoring a segment of a frequency bandwidth monitored by said channelizing receiver, said first other channel receiver is adapted for monitoring a first other segment of said frequency bandwidth and said second other channel receiver is adapted for monitoring a second other segment of said frequency bandwidth.

29. A channelizing receiver as in claim 28, wherein said segment is contiguous to said first other segment and said second other segment.

30. A channelizing receiver as in claim 22, wherein said signal amplitude calculation unit is adapted for identifying said magnitude of said input signal by identifying a predetermined number of consecutive samples of said input signal having values less than said magnitude.

31. A channelizing receiver as in claim 22, wherein said electromagnetic signal is a radio frequency signal.

32. A channelizing receiver as in claim 22, wherein each said channel receiver further comprises one or more further threshold detectors, each of said one or more further threshold detectors receiving a respective one of one or more further input signals representative of said electromagnetic signal detected by said channel receiver and producing a detection signal if said respective further input signal exceeds a predetermined threshold.

33. A channelizing receiver, said channelizing receiver including a plurality of channel receivers, each said channel receiver comprising:

a first channel for receiving a first component of an electromagnetic signal, said first channel including a first bandpass filter for transmitting said first component if said first component has a frequency falling within the bandpass of said first bandpass filter, a first log detector for receiving said first component and providing a first video signal representative of said first component, a first analog to digital converter for receiving said first video signal and providing a first digital signal representative of said first video signal;

a second channel for receiving a second component of said electromagnetic signal, said second channel including a second bandpass filter for transmitting said second component if said second component has a frequency falling within the bandpass of said second bandpass filter, a second log detector for receiving said second component and providing a second video signal representative of said second component, a second analog to digital converter for receiving said second video signal and providing a second digital signal representative of said second video signal;

a baseband combiner for combining said first digital signal and said second digital signal to provide a combined digital signal; and

a channel processor for receiving said combined digital signal and transmitting data responsive to the detection of said electromagnetic signal if the magnitude of said combined digital signal exceeds a predetermined threshold.

34. A channelizing receiver as in claim 33, wherein said channel processor is adapted for prohibiting the transmission of said data if the magnitude of said combined

digital signal is less than the magnitude of a first other combined digital signal produced by a first other channel receiver of said plurality of channel receivers in response to said first other channel receiver's detection of said electromagnetic signal.

35. A channelizing receiver as in claim 33, wherein said data includes an estimate of the frequency and bandwidth of said electromagnetic signal calculated by said channel processor.

36. A channelizing receiver as in claim 34, wherein said data includes an estimate of the frequency and bandwidth of said electromagnetic signal calculated by said channel processor.

37. A channelizing receiver as in claim 33, wherein said baseband combiner is adapted for disabling said combining and transmitting to said channel processor only one of said first digital signal or said second digital signal.

38. A channelizing receiver as in claim 33, wherein said channel processor comprises a plurality of low pass filters having different cut off frequencies for receiving said combined digital signal and separating said combined digital signal into a plurality of separate signals falling within different frequency ranges.

39. A channelizing receiver as in claim 38, wherein said channel processor further comprises a multiplexer and a plurality of threshold detectors, said multiplexer being adapted for receiving said plurality of separate signals and selecting particular ones of said separate signals for transmission to particular ones of said threshold detectors, each of said threshold detectors producing a threshold signal if the separate signal received by said threshold detector exceeds a selected threshold.

40. A channelizing receiver as in claim 39, wherein said channel processor further comprises a signal amplitude

calculation unit for receiving said threshold signals and said separate signals and producing during a selected period initiated by one of said threshold signals a peak amplitude signal providing the peak amplitude reached during said selected period of the separate signal to which said one threshold signal corresponds.

41. A channelizing receiver as in claim 40, wherein each said channel receiver further comprises a channel to channel arbitration unit for receiving said peak amplitude signal and a first other peak amplitude signal from a first other channel receiver of said channelizing receiver produced in response to said first other channel receiver's detection of said electromagnetic signal during said selected period, comparing said peak amplitude signal and said first other peak amplitude signal, and if said first other peak amplitude signal is greater than said peak amplitude signal, inhibiting said transmitting of said data responsive to the detection of said electromagnetic signal.

42. A channelizing receiver as in claim 38, wherein said plurality of low pass filters are adapted for detecting wideband electromagnetic signals and said channel processor further comprises a second plurality of low pass filters having different cut off frequencies for receiving said combined digital signal and separating said combined digital signal into a second plurality of separate signals falling within different frequency ranges, said second plurality of low pass filters being adapted for detecting narrowband electromagnetic signals.

43. A channelizing receiver as in claim 42, wherein said channel processor further comprises a multiplexer and a plurality of threshold detectors, said multiplexer being adapted for receiving said second plurality of separate signals and selecting one of said second plurality of separate signals for transmission to a threshold detector, said

threshold detector producing a threshold signal if said one separate signal exceeds a selected threshold.

44. A channelizing receiver as in claim 43, wherein said channel processor further comprises a signal amplitude calculation unit for receiving said threshold signal and said one separate signal and producing during a selected period initiated by said threshold signal a peak amplitude signal providing the peak amplitude reached during said selected period of said separate signal.

45. A channelizing receiver as in claim 44, wherein each said channel receiver further comprises an output interface for receiving said peak amplitude signal and transmitting said peak amplitude signal to a resource allocation system.

46. A channelizing receiver as in claim 33, wherein said electromagnetic signal is a radio frequency signal.

47. A channelizing receiver as in claim 33, wherein said first component and said second component are received from one or more polarizing antennas, and said first component is a first polarized component of said electromagnetic signal and said second component is a second polarized component of said electromagnetic signal.

48. A channelizing receiver as in claim 47, wherein said one or more polarizing antennas are orthogonally polarizing antennas, and said first polarized component and said second polarized component are orthogonally polarized.

49. A method for detecting an electromagnetic signal falling within a frequency band, said method comprising:

providing a channelizing receiver having a plurality of channels, each of said channels including a bandpass filter for transmitting signals within a segment of said frequency band;

providing for each channel a channel processor for receiving said signals, producing a detection signal indicating the detection of said electromagnetic signal and producing a magnitude signal indicating the magnitude of said electromagnetic signal;

identifying within a predetermined time period a group of said channel processors producing said detection signals;

comparing for said group the magnitude signals corresponding to said detection signals to identify the magnitude signal indicating the highest magnitude; and

transmitting for said group from said channelizing receiver data corresponding to one of said detection signals only if said one detection signal is associated with said magnitude signal indicating said highest magnitude.

50. A method as in claim 49, further comprising assessing the relative magnitudes of said magnitude signals of said group and wherein said data comprises information providing an estimate of the frequency and bandwidth of said electromagnetic signal based upon said relative magnitudes.

51. A method as in claim 49, wherein said magnitude signal indicates the peak amplitude of said electromagnetic signal reached during said predetermined time period.

52. A method as in claim 50, wherein said data comprises information identifying the beginning of a pulse of said electromagnetic signal and the end of said pulse.

53. A method as in claim 49, wherein each said segment of said frequency band is contiguous to at least one other segment of said frequency band.

54. A method as in claim 49, wherein said electromagnetic signal is a radio frequency signal.

55. A channelizing receiver, said channelizing receiver including a plurality of channel receivers, each said channel receiver comprising:

receiving means for receiving an input signal representative of an electromagnetic signal detected by said channel receiver and producing a detection signal if said input signal exceeds a predetermined threshold;

transmitting means for transmitting data responsive to said detection signal from said channel receiver;

producing means for producing a magnitude signal providing the magnitude of said input signal; and

comparing means for comparing said magnitude signal to a first other magnitude signal from a first other channel receiver of said channelizing receiver produced in response to said first other channel receiver's detection of said electromagnetic signal, and if said magnitude signal is less than said first other magnitude signal, inhibiting said transmitting means from transmitting said data.

56. A channelizing receiver as in claim 55, wherein said comparing means comprises means for comparing said magnitude signal to a second other magnitude signal from a second other channel receiver of said channelizing receiver produced in response to said second other channel receiver's detection of said electromagnetic signal, and inhibiting said transmitting means from transmitting said data if said magnitude signal is less than one or both of said first other magnitude signal and said second other magnitude signal.

57. A channelizing receiver as in claim 56, wherein each said channel receiver further comprises estimating means for estimating the bandwidth and frequency of said electromagnetic signal on the basis of an additional magnitude signal produced by said producing means in response to said detection signal, a first other additional magnitude signal

from said first other channel receiver produced in response to said first other channel receiver's detection of said electromagnetic signal and a second other additional magnitude signal from said second other channel receiver.

58. A channelizing receiver as in claim 55, wherein said comparing means includes means for permitting the transmission from said transmitting means of said data if said magnitude signal is greater than said first other magnitude signal.

59. A channelizing receiver as in claim 56, wherein said comparing means includes means for permitting the transmission from said output interface of said data if said magnitude signal is greater than both said first other magnitude signal and said second other magnitude signal.

60. A channelizing receiver as in claim 57, wherein said data further provides the beginning of a pulse of said electromagnetic signal, the end of said pulse and an estimate of the frequency and bandwidth of said pulse calculated by said estimating means.

61. A channelizing receiver as in claim 56, wherein said channel receiver further comprises means for monitoring a segment of a frequency bandwidth monitored by said channelizing receiver, said first other channel receiver comprises means for monitoring a first other segment of said frequency bandwidth and said second other channel receiver comprises means for monitoring a second other segment of said frequency bandwidth.

62. A channelizing receiver as in claim 61, wherein said segment is contiguous to said first other segment and said second other segment.

63. A channelizing receiver as in claim 55, wherein said producing means comprises means for identifying said magnitude of said input signal by identifying a predetermined

number of consecutive samples of said input signal having values less than said magnitude.

64. A channelizing receiver as in claim 55, wherein said electromagnetic signal is a radio frequency signal.

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